> Once a cutting decision is made, it cannot be undone, therefore, making better decisions further upstream provides the opportunity to achieve better cutting decisions downstream

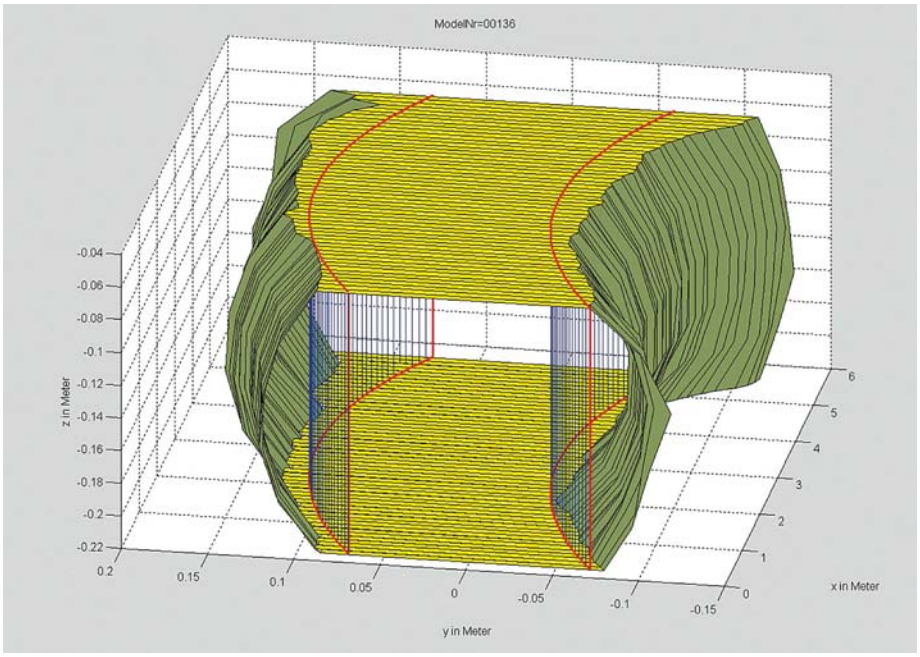
not necessarily lead to increased recovery. To go past the 98% barrier a system needs to have more information. Combining high density colour vision with high density 3D scanning is the key to look at surface defects to make a 'value added' decision. In addition to knots, pitch, cracks and other defects, colour vision is important to detect stain, not possible with monochrome vision.

LMI's DynaVision™ products are high-speed 3D sensors that support integrated true colour vision technology for log breakdown to board and cant optimisation. DynaVision products are designed to give a premium amount of profiling information, differential scanning, and, with the new yellow products, colour vision for defect detection. These features allow original equipment manufacturers (OEM) to make higher value optimisation decisions that improve lumber grades, increase yield output, and decrease material waste.

German supplier **EWD** is using the latest scanning and optimisation technologies with sawline feed speeds up to 200 m/minute for highest recovery and productivity. Bergkvist, Insjön in Sweden is one of the country's largest family-owned sawmills. Its old sawline system was considered to be a prime example for high recovery and efficiency. In 2006, Bergkvist aimed to replace it with new and advanced technology to further increase the recovery by a "considerable amount".

"EWD took the challenge and developed a new sawline concept, which melts the advantages of the EWD ArcoLine active curve sawing process with the advantages of full optimisation of the board profiling process," according to the company. "This new hybrid concept delivers far better recovery, compared to the standard profiling systems. The machinery and positioning systems have to perfectly execute the solution given by the sawline optimisation."

The sawline processes logs sorted to centre product, with full optimisation of side boards and number and position of centre products. The line employs six 3D true-shape scanners to control each processing step and also cross-check the previous step. They allow an iterative optimising process for each log and data is



EWD has optimised the curve sawing process

collected for a continuous monitoring of the achieved recovery.

The 3D scanner number 1 measures the round log and optimises the ideal rotation for primary break down, based on the optimum saw pattern. The 3D scanner number 2 is placed behind the primary break down chipper canter number 1 to control the rotation and centring process and optimises the outer side boards for a diagonal shifting profiling process with optimum width, position and angle of the boards.

The two outer side boards are profiled by

> This new hybrid concept delivers far better recovery, compared to the standard profiling systems

profiling unit number 1, which employs special notching saws to achieve a top chip quality with a high F3A percentage. This feature is installed on all profiling units of the line. The 3D scanner number 3 is placed behind the profiling unit number 1 and repeats the process for the two inner side boards, which are profiled by profiling unit number 2. Because of the diagonal shifting function and the full optimisation process, each profiling unit replaces one full high performance edger optimiser system. Following the double arbour circular saw for the side boards, all cants are turned on the fly 90°, at up to 180 m/minute line speed.

The 3D scanner number 4 then scans the two-sided cant and checks the previous process and does the full cant optimisation for

Because of the diagonal shifting function and the full optimisation process, each profiling unit replaces one full high performance edger optimiser system

secondary and final break down. Depending on the cant shape, the following process could be either curve chipping or slew chipping and sawing. The CNC-controlled ArcoLine process is employed at all further machine centres. The first step is the chipping of the two faces with the ArcoLine chipper canter number 2, either a CNC-controlled radius for curved cants or with diagonal shifting of the canter heads for straight chipping. The precise radius is used by all further machine centres for the positioning of the cants and ensures that the sawing accuracy of the curve sawing line is absolutely on par with a conventional straight sawing line.

The secondary breakdown uses 3D scanner numbers 5 and 6 to optimise up to four side boards in a similar way like scanners 2 and 3. Scanner number 5 also continuously monitors the work of scanner number 4. Secondary breakdown side boards are profiled by profiling

units numbers 3 and 4. The final breakdown consists of a double arbour circular resaw with two units. While unit 1 is in operation, unit 2 can be fitted with new saws.

"The use of the scanners in linear mode and the perfect execution of the optimisation solution ensures that side boards and centre product fall all within the specified grade, ie. the allowable amount of wane is not exceeded. A further benefit of the ArcoLine concept for sawmill Bergkvist is the splitting of even-numbered centre product solutions along the pith of the cant. This feature provides a better lumber quality.

Optimisation in a sawmill has been described by many as the pursuit of getting the most amount of lumber from a given log. In recent years many sawmills have begun to focus in on the relationship between accuracy of saw guides for circular saw edgers and optimisation, according to **Modern Engineering**.

"Since log costs are increasing all over the world and annual cut allowances are decreasing, sawmills are being pushed to examine all aspects of their operations. Saw guides are being closely examined as part of this process. Sawmills are finding that their saw guides are inaccurate and poorly maintained, which is leading to large losses in fibre and contributing to downtime. Through the use of highly accurate saw guides, sawmills are finding that they are contributing to a reduction of waste and target size for increased recovery," the saw guide manufacturer said.

Modern is a manufacturer of one of the most highly accurate edger saw guides. Typically most other saw guides on the market come with an accuracy that varies from an extreme of +/- 0.127 mm or worse to +/- 0.0127 mm, the company said. Modern saw guides are +/- 0.005 mm. The clearance between the saw guide babbitt and the saw blade is affected by the accuracy between the saw guides in a given stack. Inaccurate saw guides can lead to too much or too little clearance. Too much clearance causes a lack of support for the saw blade and therefore the saw blade begins to wander and causes a large amount of within-board deviation. This deviation will contribute to high loss of fibre. Too little clearance causes the saw blades to heat up because of increased friction between the saw blade and the babbitt or bearing pad. This heating causes the saw blades to eventually lose their tension and fold over. Folding over of saw blades causes downtime in a sawmill and can lead to productivity losses.

> Since log costs are increasing all over the world and annual cut allowances are decreasing, sawmills are being pushed to examine all aspects of their operations

Modern manufactures saw guides in both aluminum and steel. Aluminum saw guide accuracy is achieved by honing the aluminum saw guide before and after the application of engineering hardcoat anodising (Type 3). This industrial anodising, which is a grey to dark grey colour, is much thicker (12.7-115µ) than your standard coloured anodising (known as Type 2 and is 1.8-25.4µ thick) that many manufacturers are using today. Through honing and the use of an engineering hardcoat, Modern achieves a very accurate (+/- 0.005 mm) and highly abrasion-resistant aluminum saw guide.

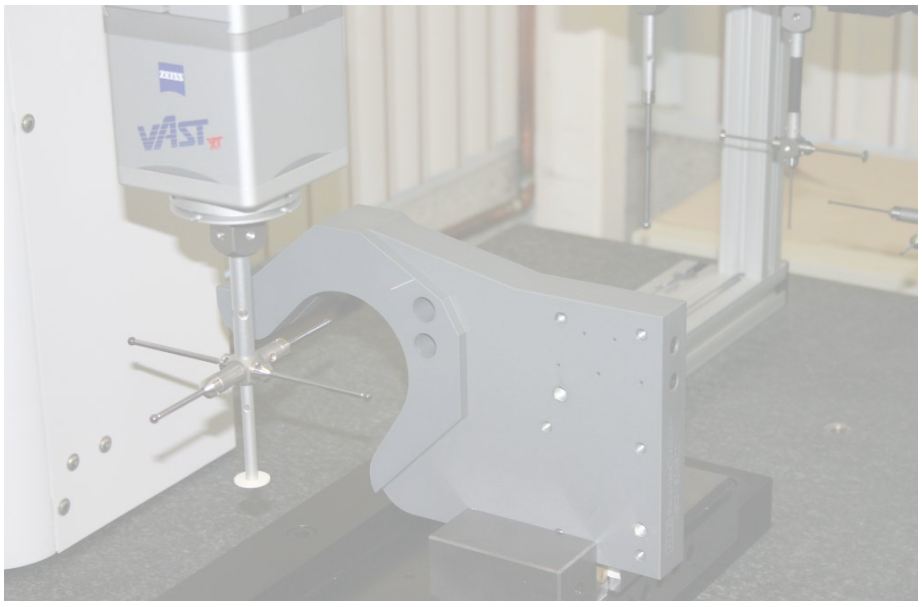
Steel saw guides are manufactured at Modern using premium steels that are precision ground to size. Accuracy of the steel saw guides matches that of the aluminum ones (+/- 0.005 mm). In addition Modern offers penetrant coatings that increase corrosion resistance and hardness. This is critical in harsh applications and environments, according to the manufacturer.

In order to ensure that the saw guides meet the critical tolerance, Modern uses highly accurate Zeiss CNC (computer numeric controlled) coordinate measuring machines to measure and verify the accuracy of all saw guides manufactured in its facility. It is important to note that good maintenance of saw guides is also critical in ensuring that the saw guides remain in the best of condition. Modern also assists customers by advising on best practices for maintenance of saw guides so that they maintain their accuracy for a longer period of time.

"As time moves forward, sawmills must keep examining ways of optimising their equipment and systems because of the ever increasing need to generate high quality lumber at a lower cost with higher recovery. Highly accurate saw guides, manufactured by Modern increase the accuracy and reliability of the lumber manufacturing process. Accurate saw guides lead to higher recovery and increased uptime of the equipment, which is critical in the sawmill optimisation process," Modern stated

One of the biggest problems in today's mills is the growing complexity of optimisation systems such as log scanners, according to **Prologic** +. Simplifying those systems is not always easy and can sometimes be achieved by compromising the performance. With the Prologic+ True Shape Scanner, using the new DynaVisionT chroma+scan 2000 series, you get the simplicity without the drawback. The scanning hardware consists of a FireSyncT Master and 2 or 4 DynaVision chroma+scan 2010 heads. The FireSyncT Master is basically a hub to distribute power, connectivity and synchronisation to the heads using a single cable. The FireSyncT Master is usually placed directly on the scanner frame, with the advantage of only having one ethernet cable required between the scanner frame and the scanner computer, which greatly reduces the wiring complexity.

"One of the biggest advantages of the DynaVision chroma+scan 2010 is the two cameras inside used to read the laser," Prologic explained. They provide binocular 3D profile scans that eliminate occlusions due to protruding features. This avoids data dropouts that would occur with a conventional single camera sensor. Also, using built-in tools, it is possible to ignore background lighting or reflections without any dead zone, again because of the binocularity. Laser alignment is no longer a hassle with this system. All lasers are synchronised in a way that neighbouring lasers do not interfere when a head is capturing



Modern saw guides reduce fibre loss significantly